

# Astrometric Data Sources For Space Surveillance and Space Control

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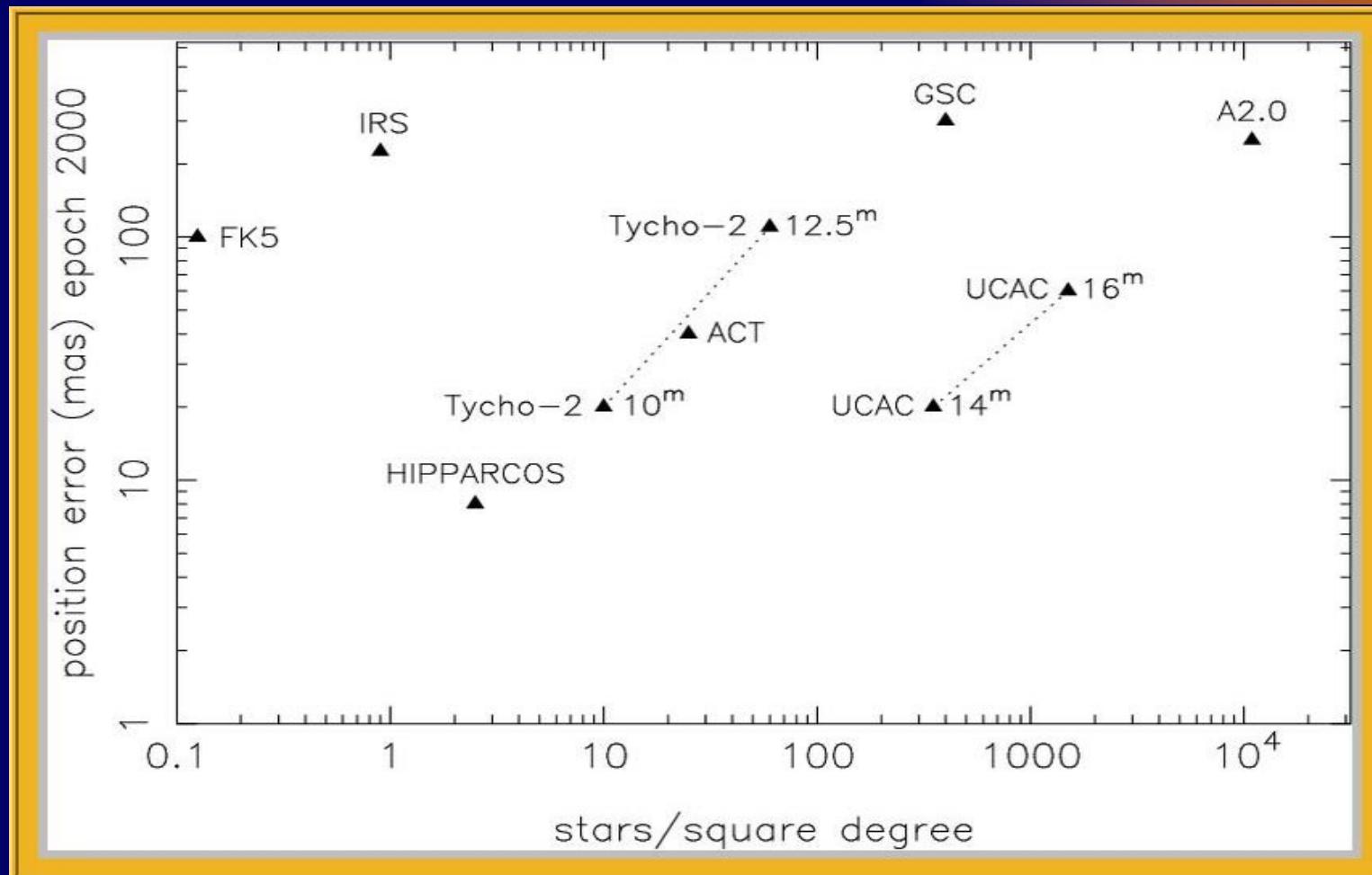


# Error Budget

- How much devoted to *a priori* data?
- Systems moving toward higher accuracies
  - *a priori* data accuracies become important
  - Should utilize best data
  - Best changes: allow for updates
- Factors of 100 *for same star* not uncommon



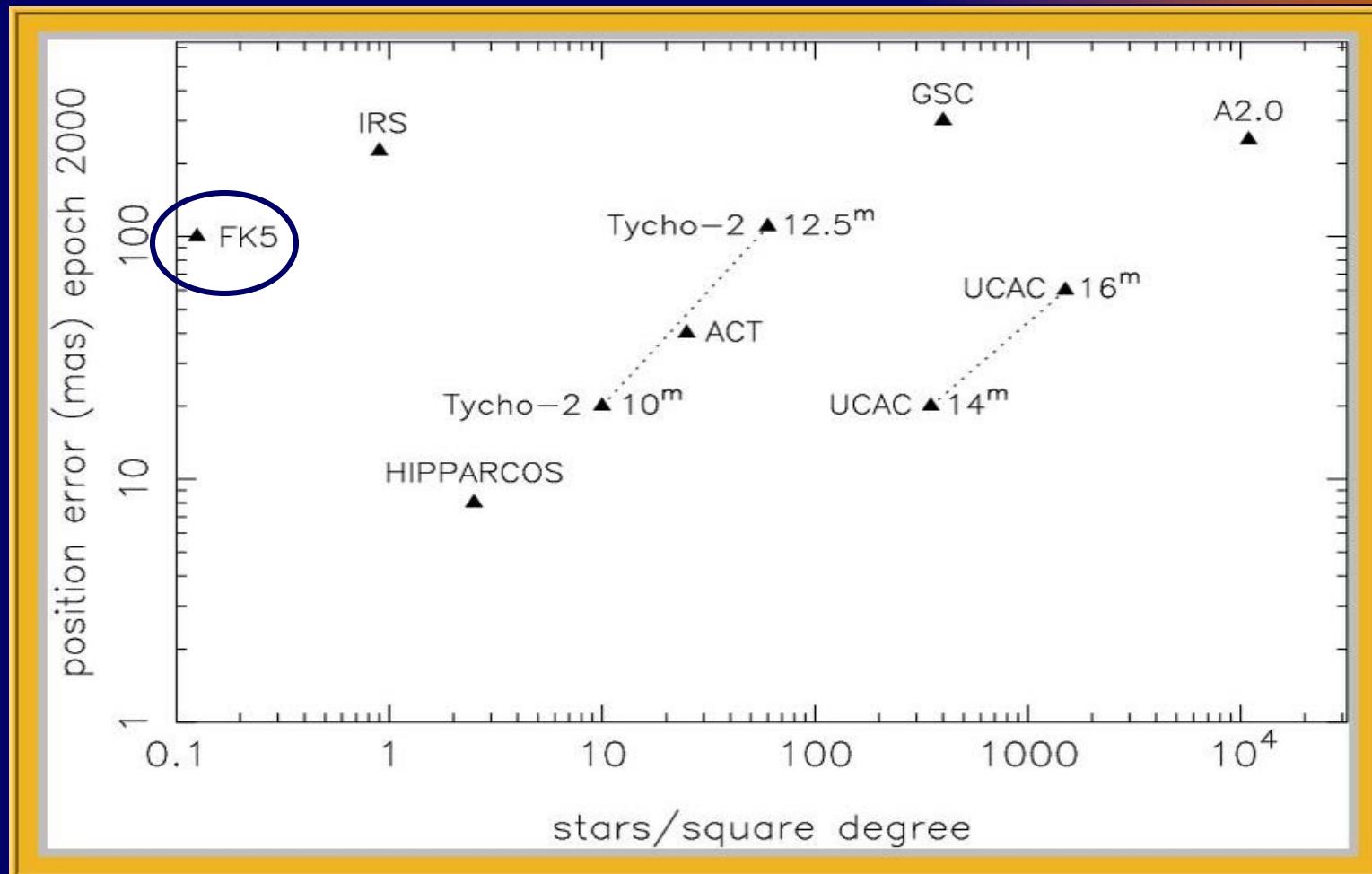
# Major Astrometric Catalogs



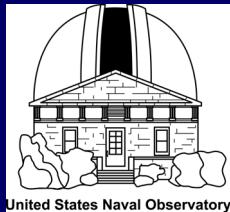
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# Major Astrometric Catalogs



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## *FK5 – Old Standard*

- Number of stars: 4652
- Mag. Range: 0 to 9 (sparse beyond 6)
- Accuracies (2000)
  - Pos = 100 mas; P.M = 2 mas/yr
- Transit circle data – long epoch span
- Obsolete by Hipparcos



# *Obsolete FK5-based Catalogs*

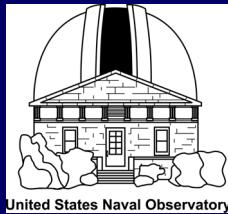


IRS – International Reference Stars

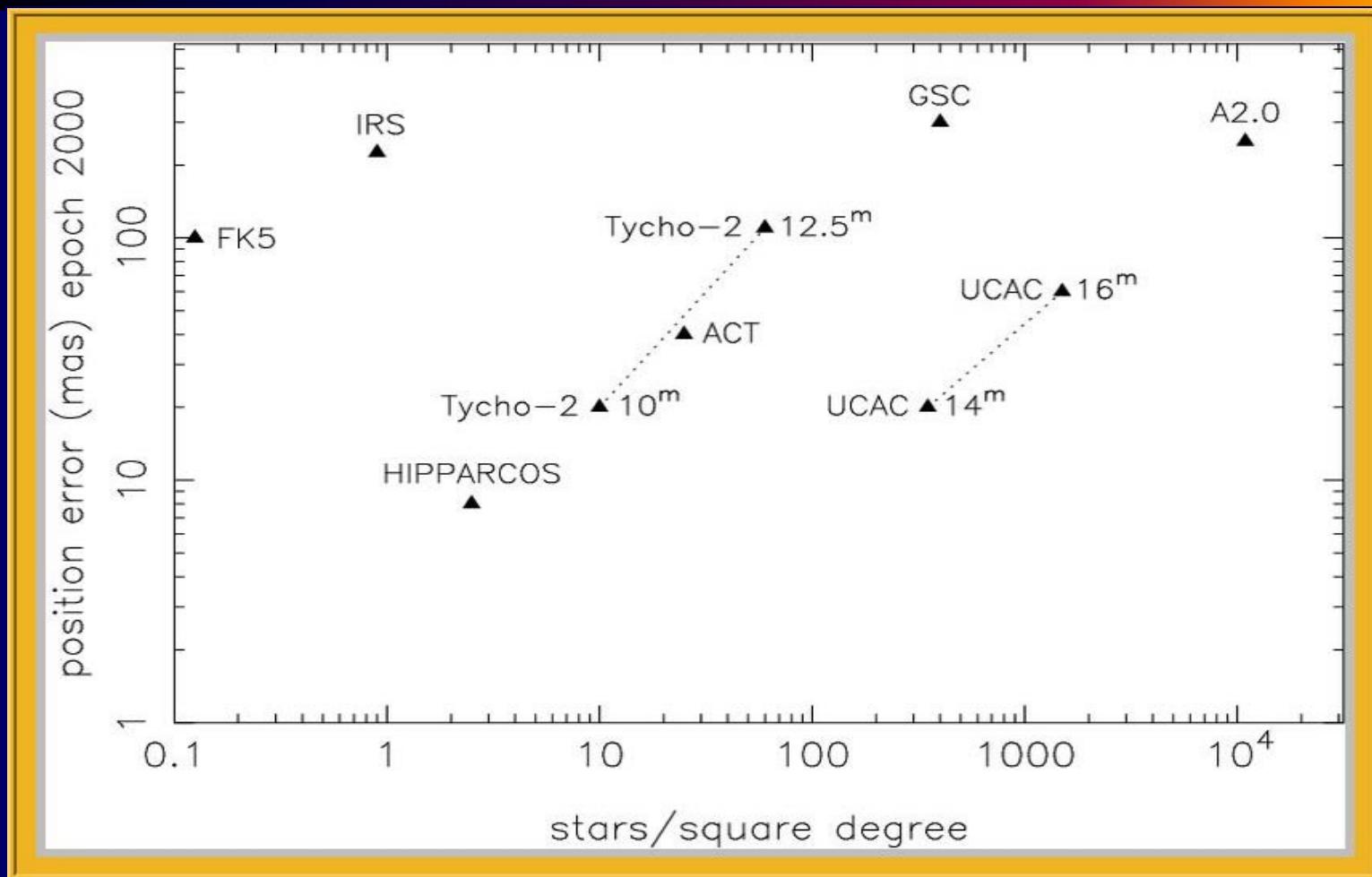
ACRS – Astrographic Cat. Reference Stars

PPM – Positions and Proper Motions

SAO – All incarnations



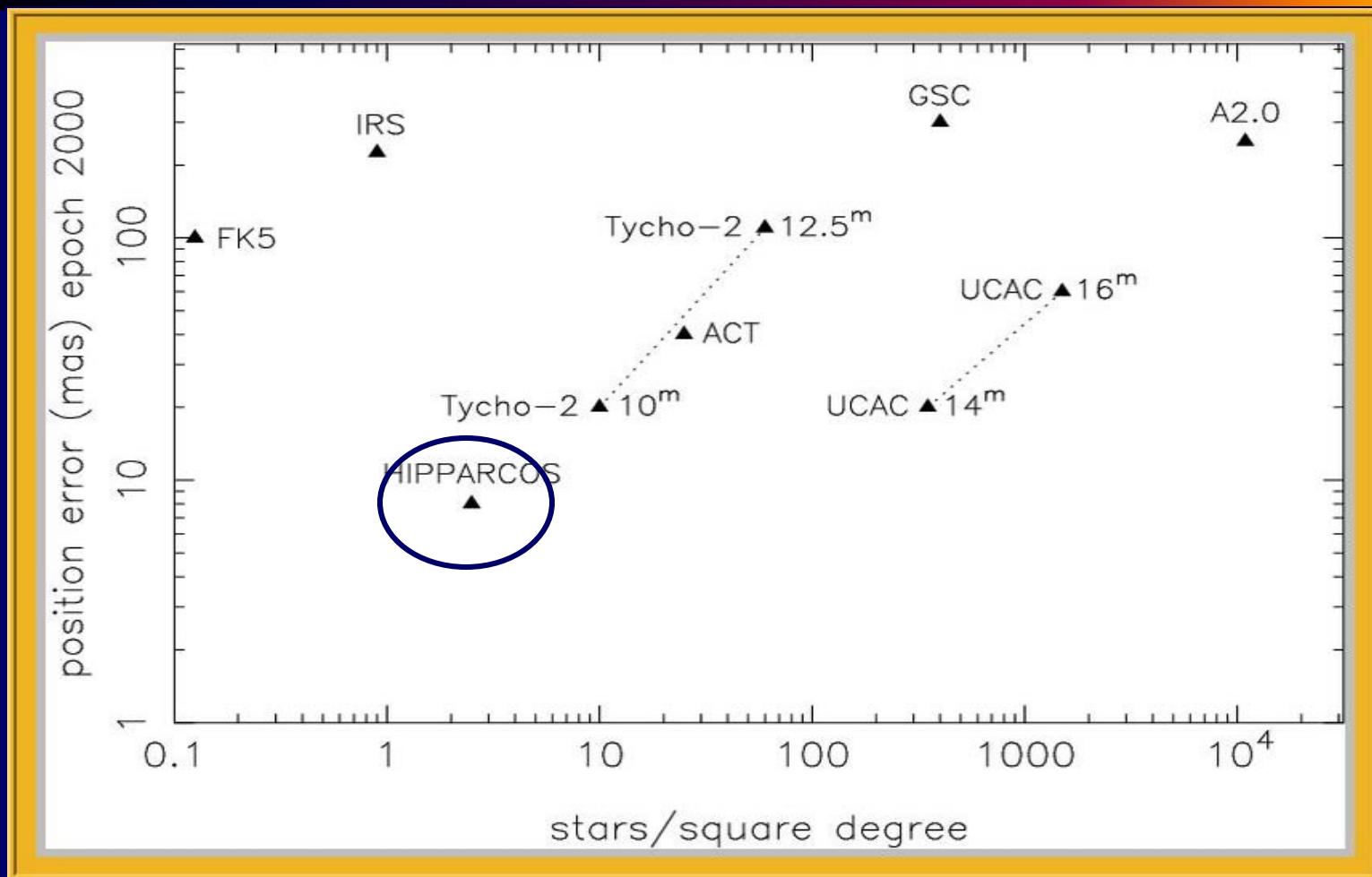
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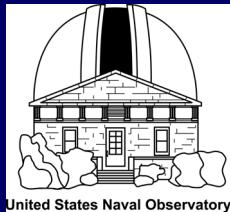
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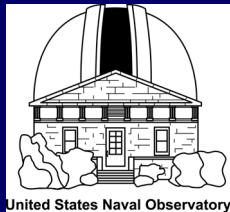
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# *Hipparcos – New Standard*

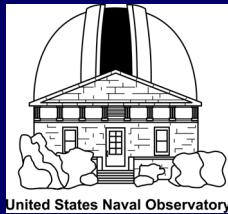
- Number of stars: 118,000
- Accuracies (2000)
  - Positions: 10 mas
  - Proper motions: 1-2 mas
- HIP satellite observations
- Not obsolete



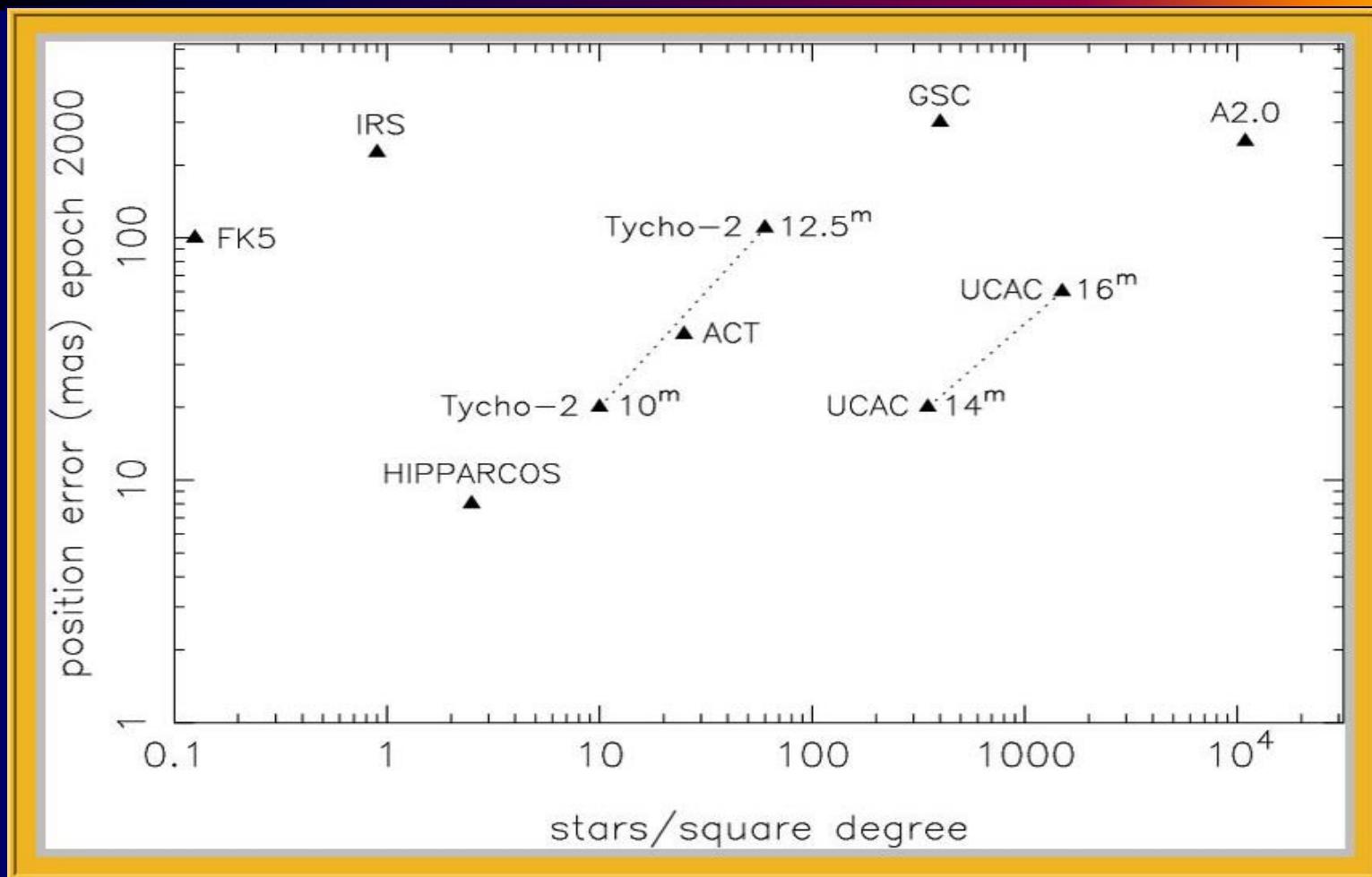
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## *Hipparcos, continued*

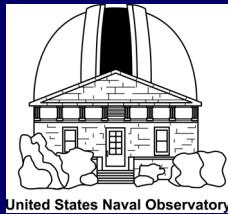
- Complete to  $V=7.3$
- Stars as faint as 12<sup>th</sup>
- For high precision work, must be aware of flagged data



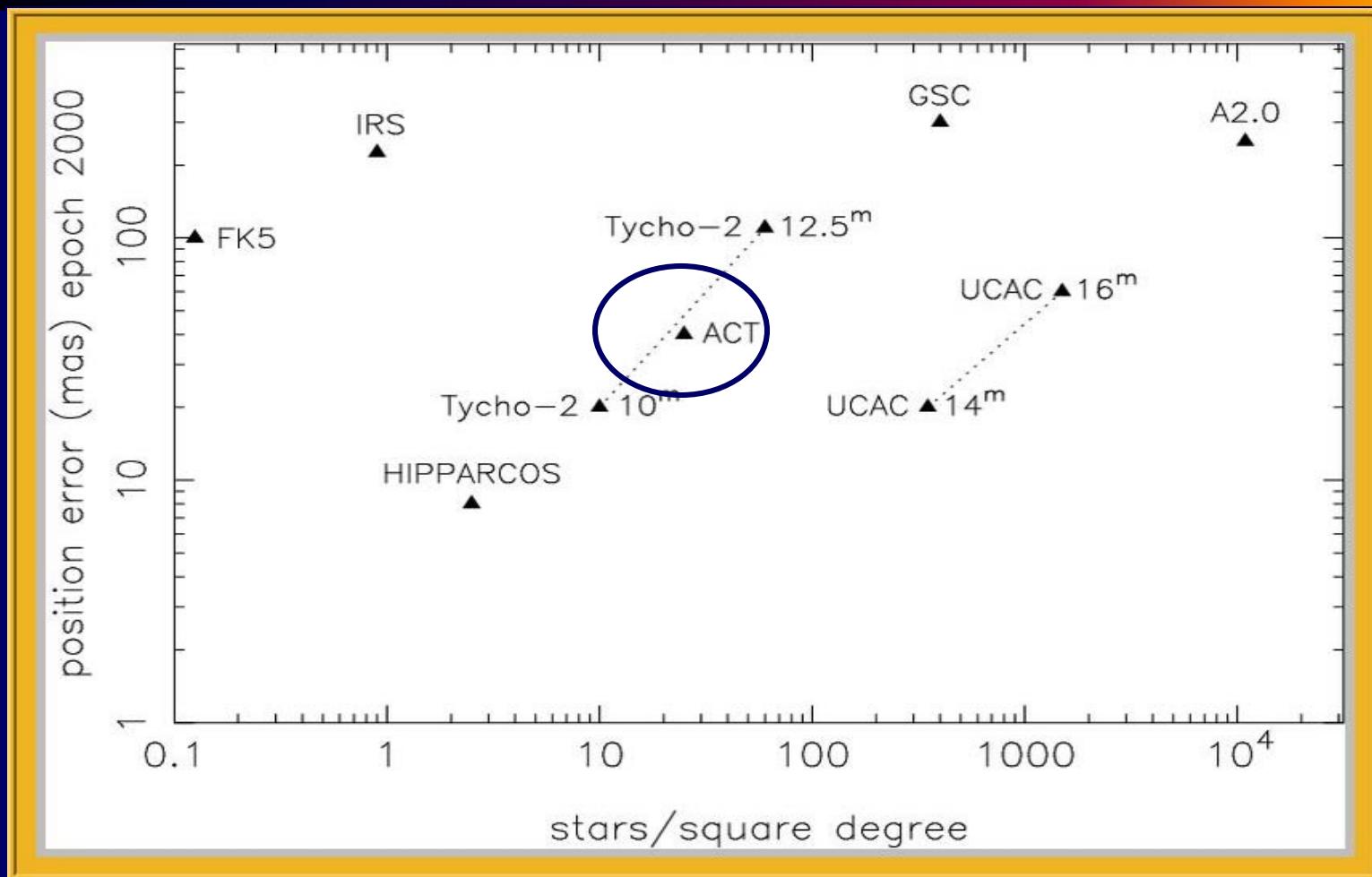
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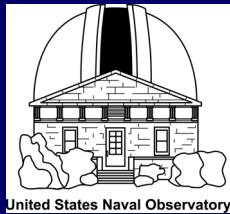
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# Major Astrometric Catalogs



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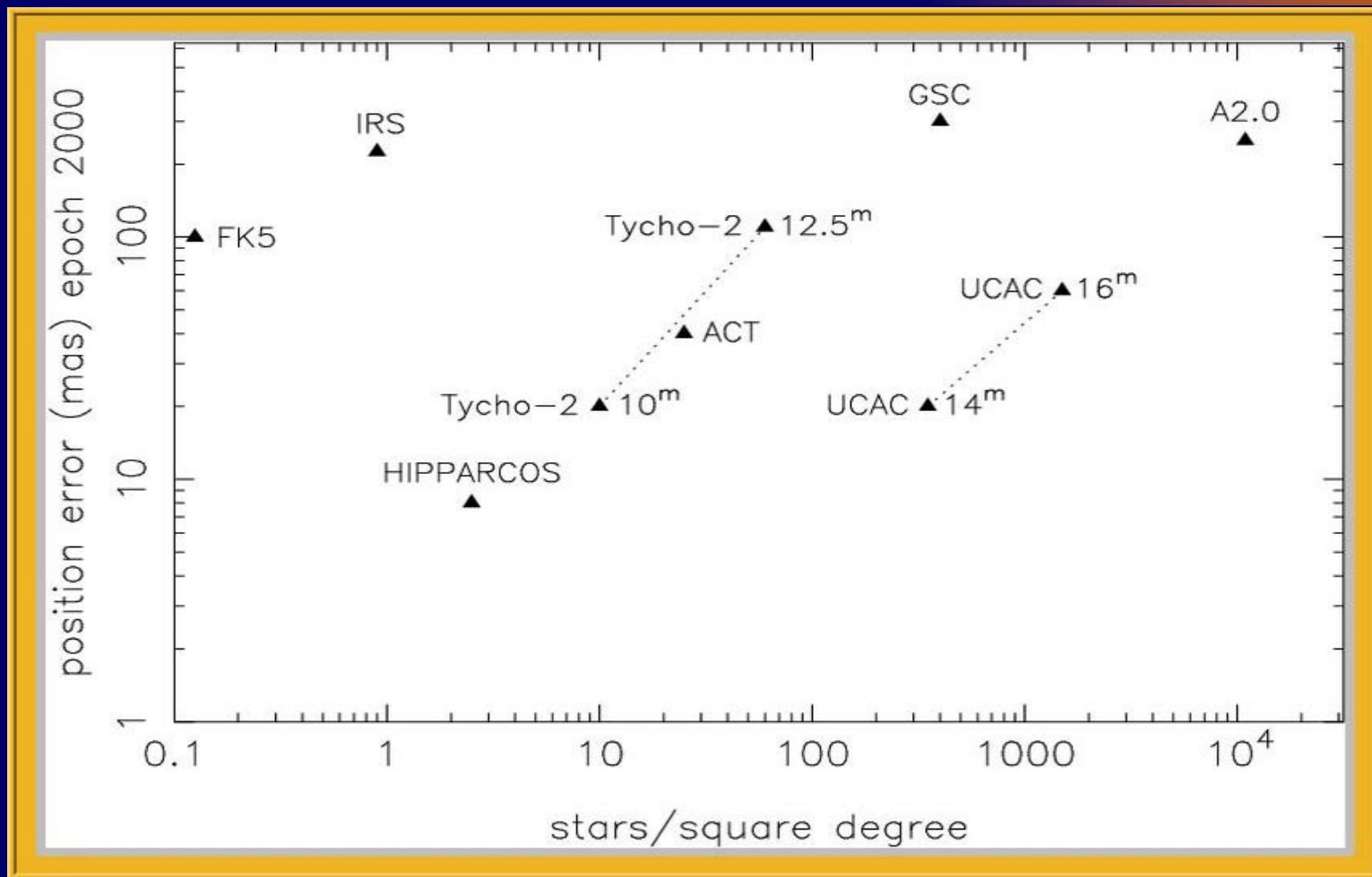


# *ACT Reference Catalog*

- Number of stars: 998,758
- Mag. Range: 4<sup>th</sup> to 11<sup>th</sup>
- Accuracies (2000)
  - Pos = 40 mas; P.M. = 3 mas/yr
- Tycho (on HIP) and AC
- Obsolete by Tycho-2



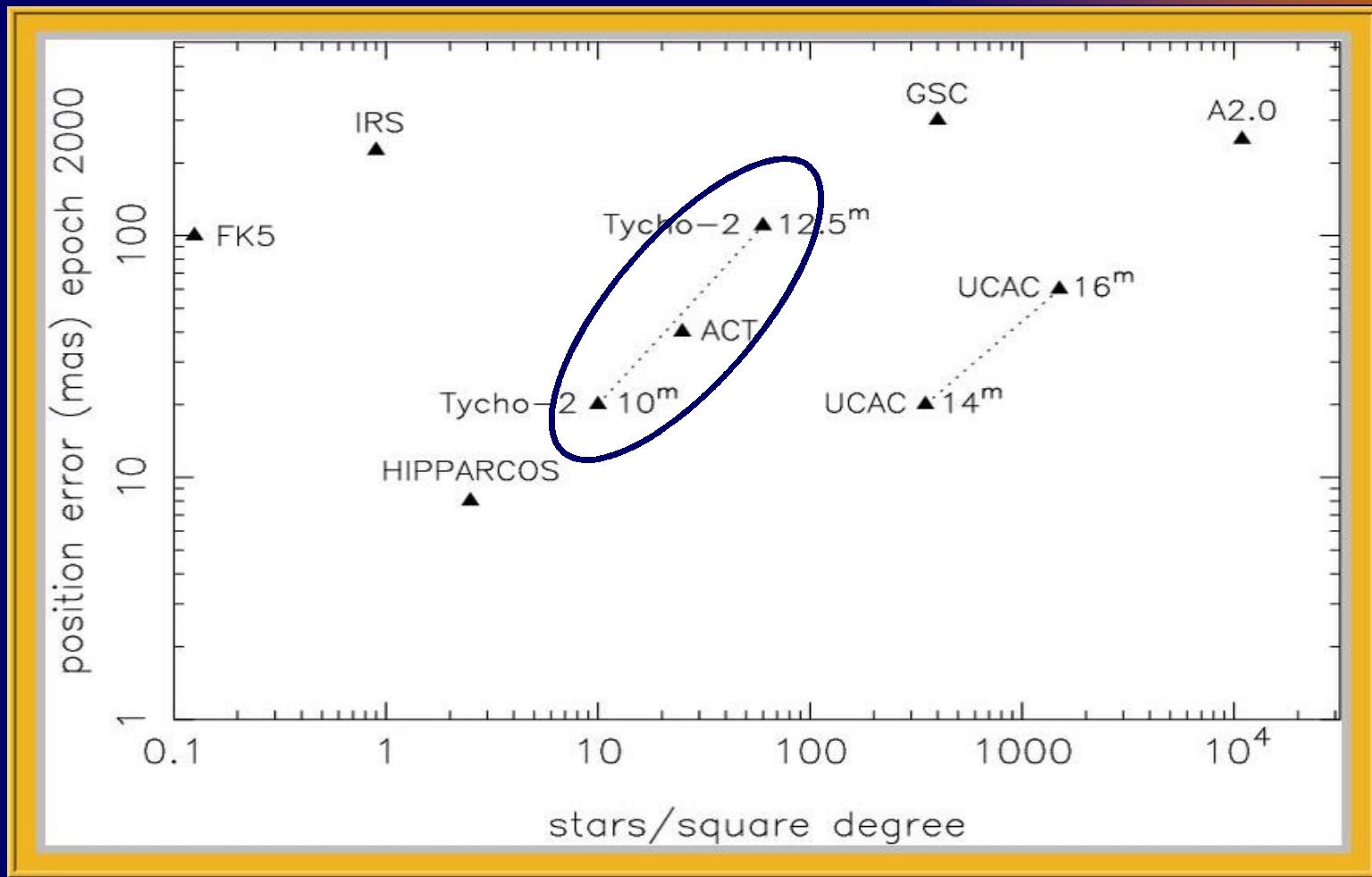
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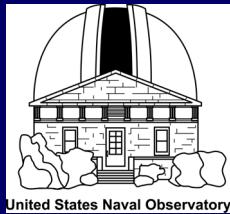
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# Major Astrometric Catalogs



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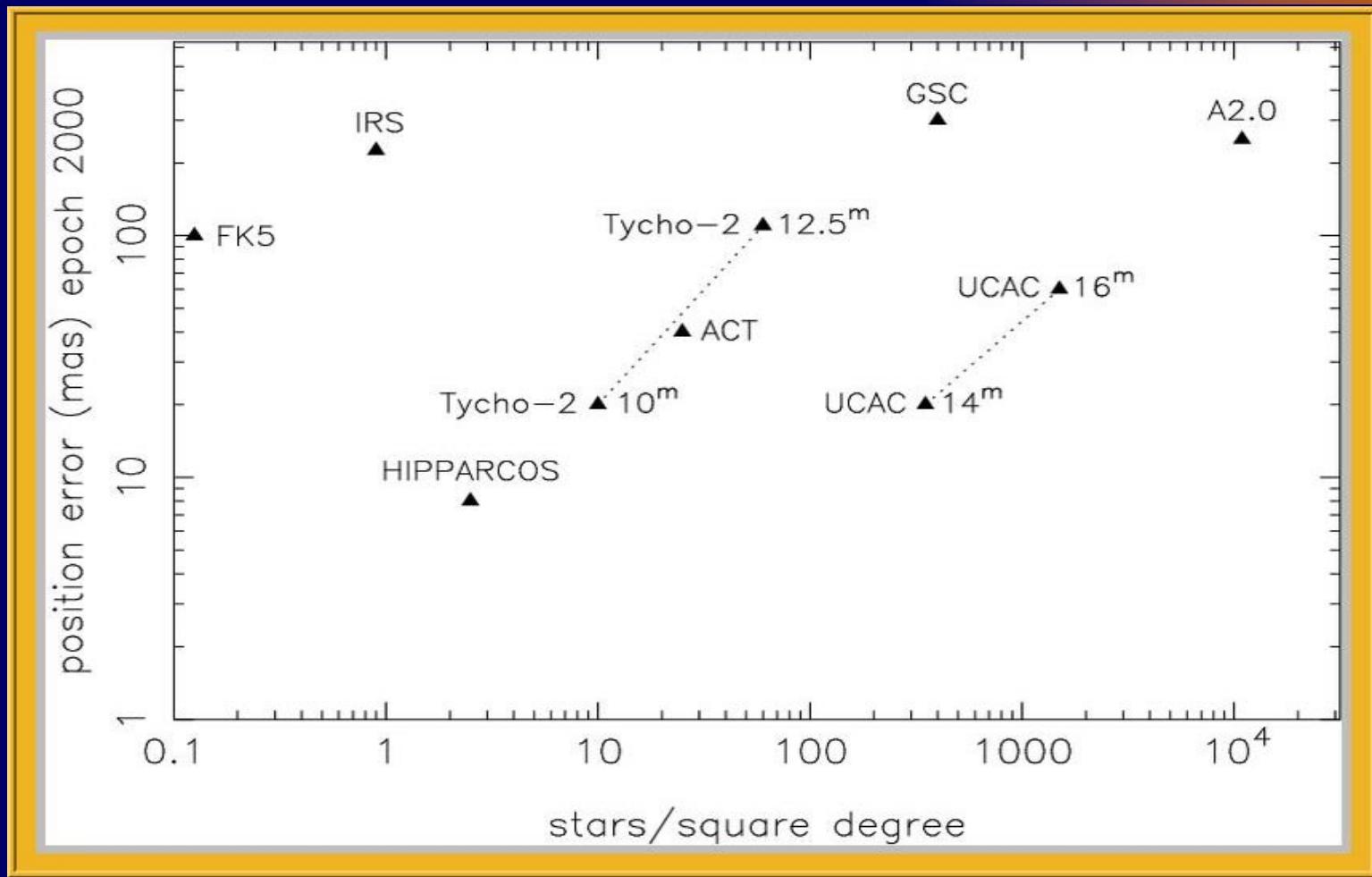


# *Tycho-2*

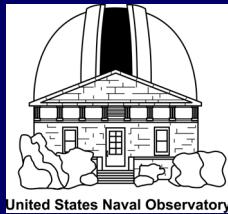
- Number of stars: 2.54 million
- Mag. Range 0 to 12th
- Accuracies (2000)
  - Pos = 40 mas; P.M. = 1 to 3 mas/yr
- Tycho + TC + Astrographs + AC
- Not obsolete
- Disks available through me



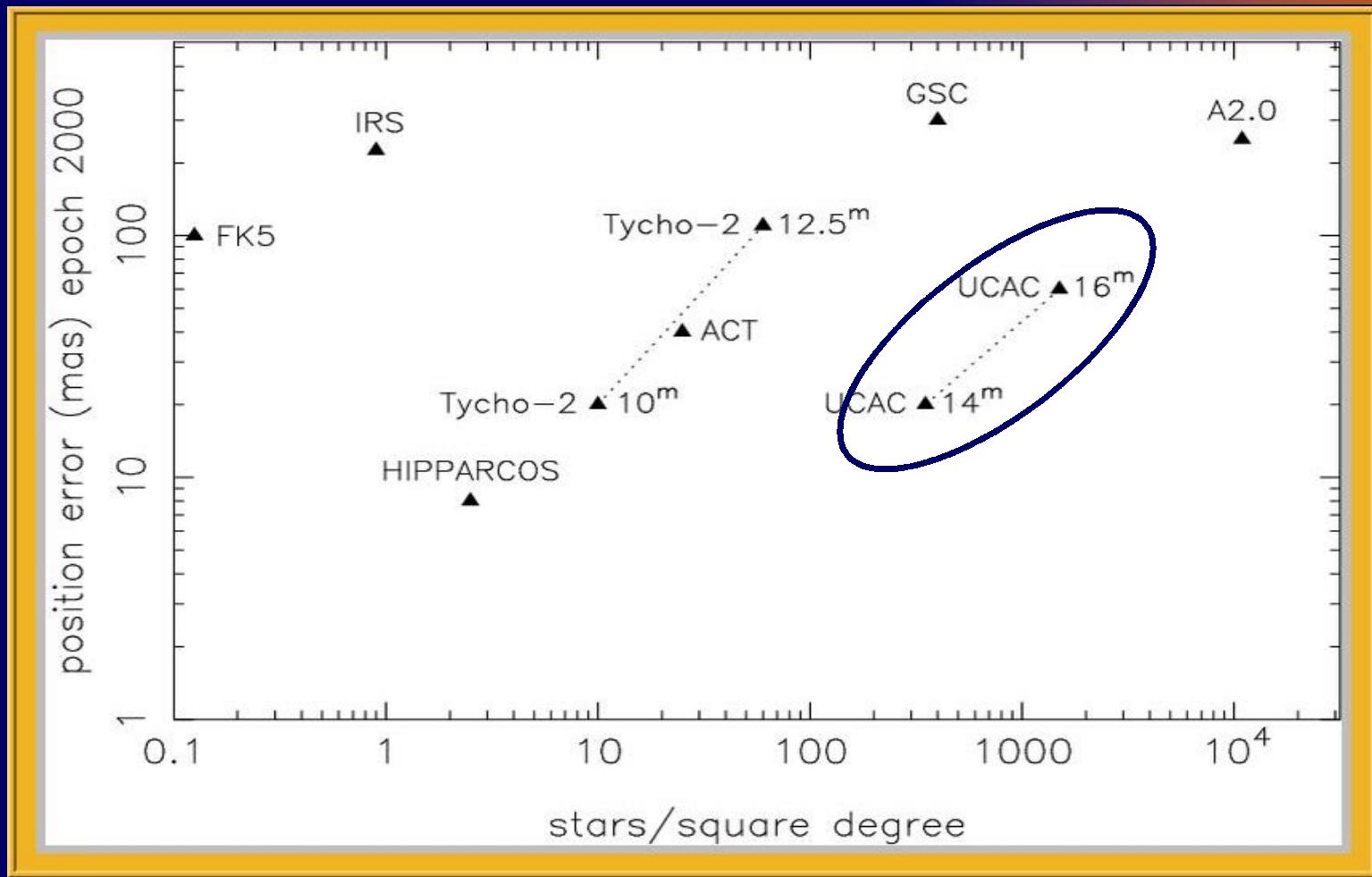
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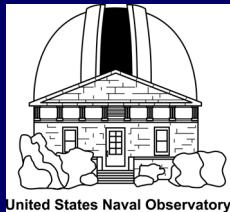
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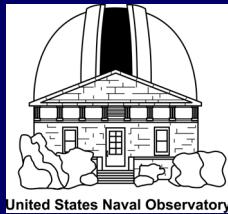
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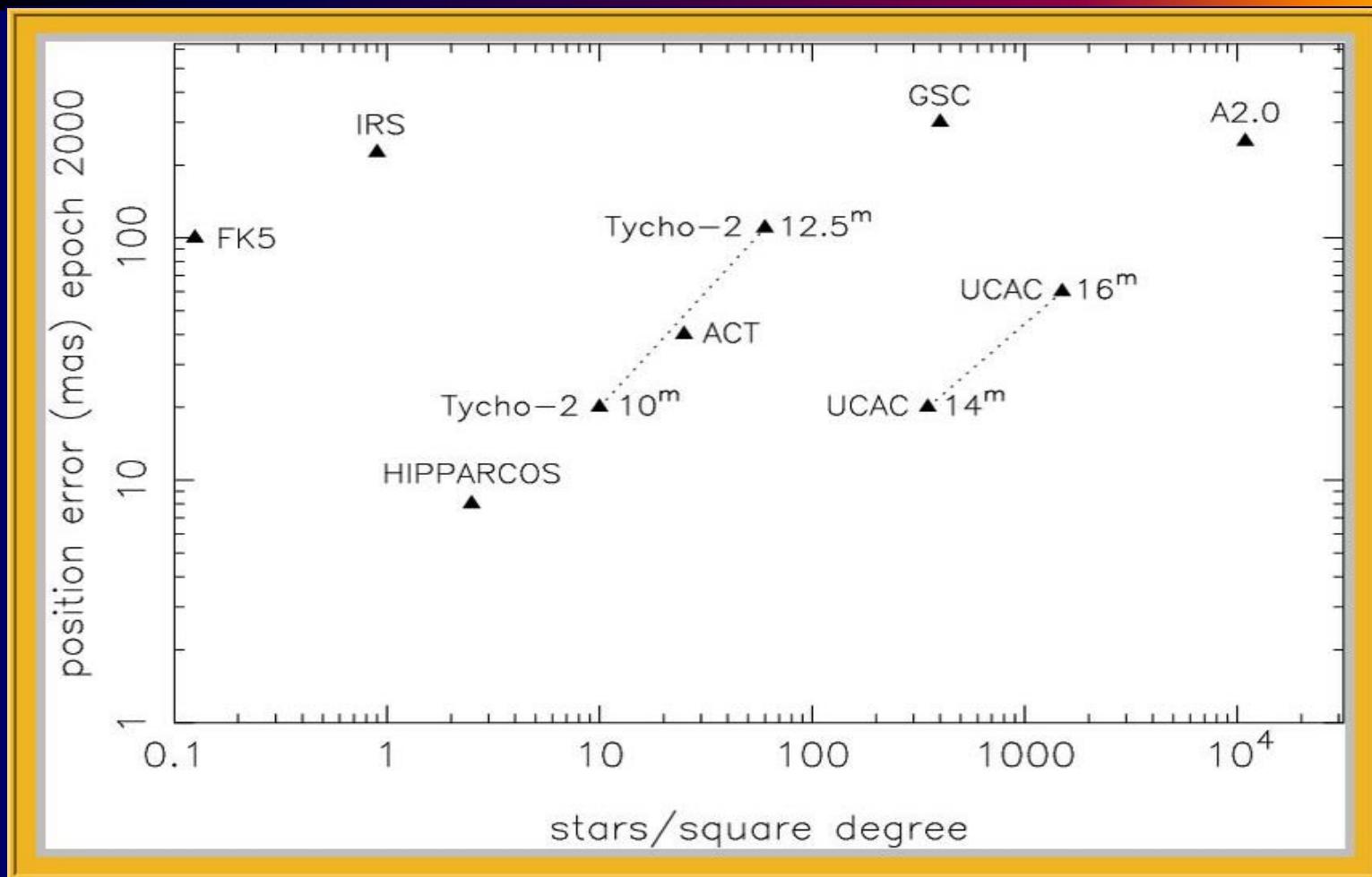
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*UCAC1*

- Preliminary release March 2000
- Southern hemisphere coverage only
- Mag. Range 8<sup>th</sup> to 16<sup>th</sup>
- Accuracies (2000)
  - Pos. 20 to 70 mas; P.M. 2 to 12 mas/yr
- Observing continuing



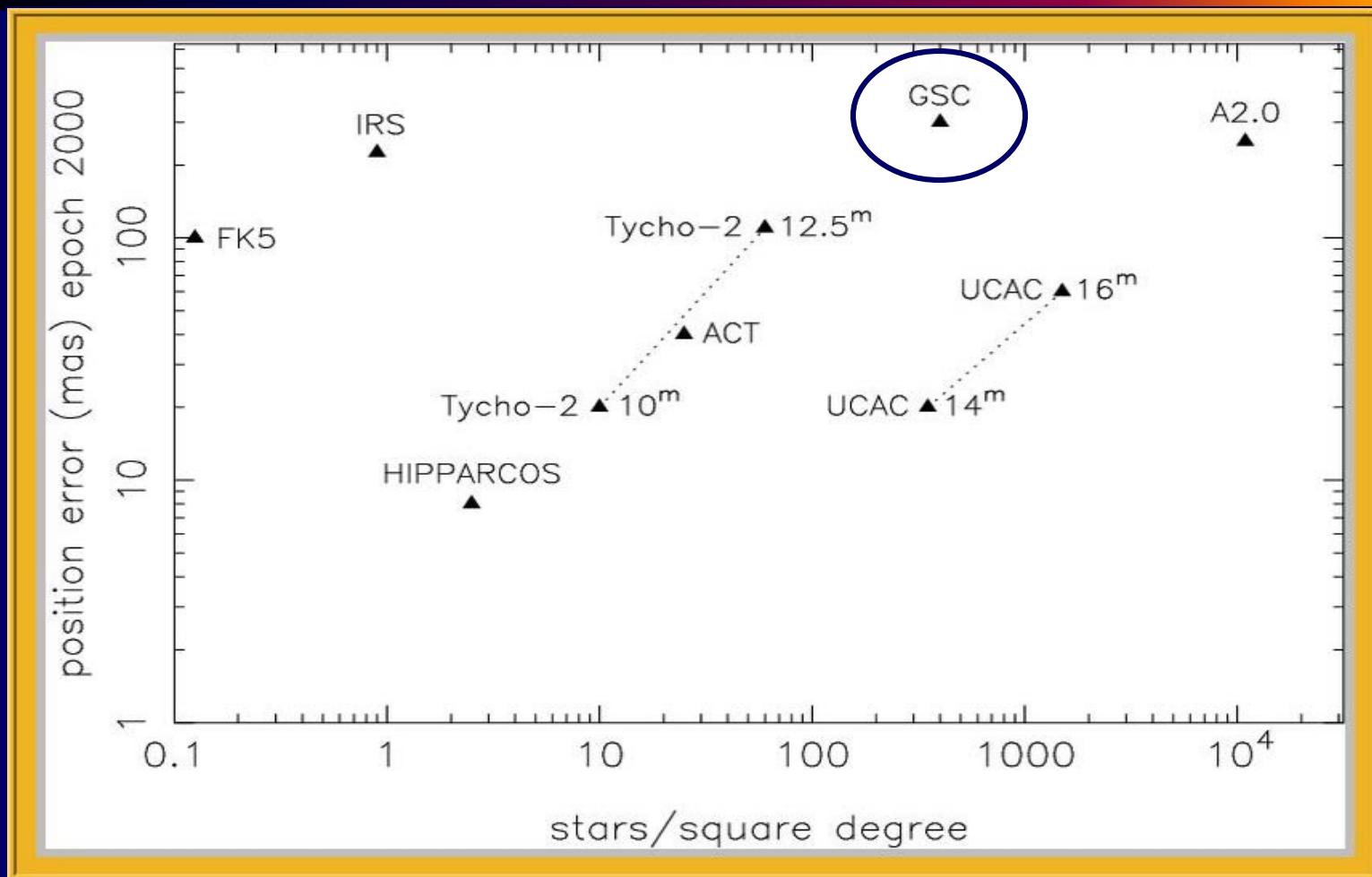
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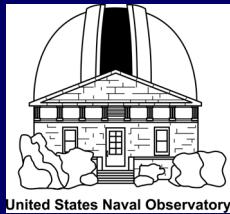
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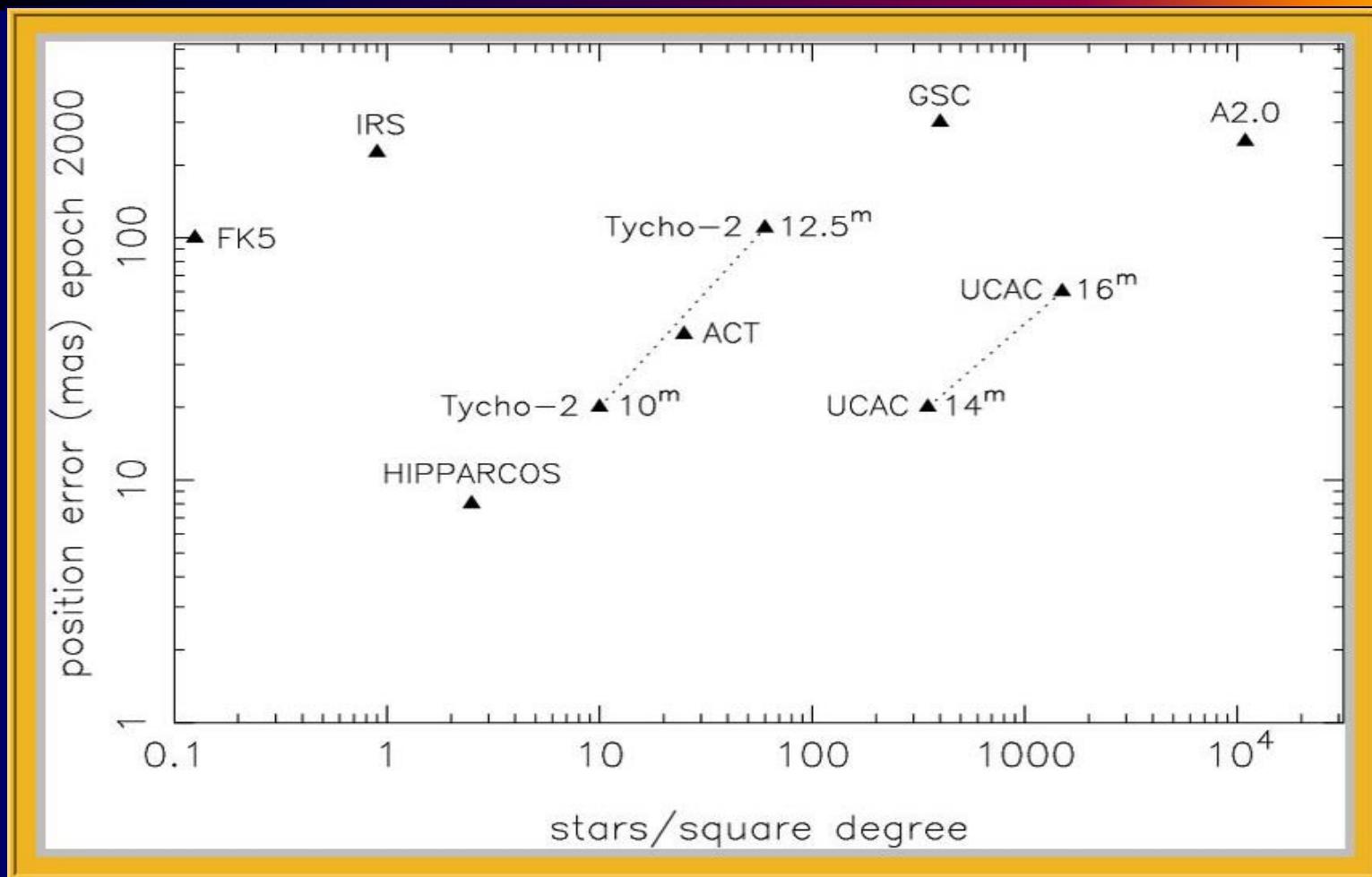


# *Guide Star Catalog 1.2*

- Number of stars: 19 million
- Mag. Range 6 to 15<sup>th</sup>
- Accuracies 500 mas?
- Single epoch only, no proper motions
- Recommend using USNO A2.0



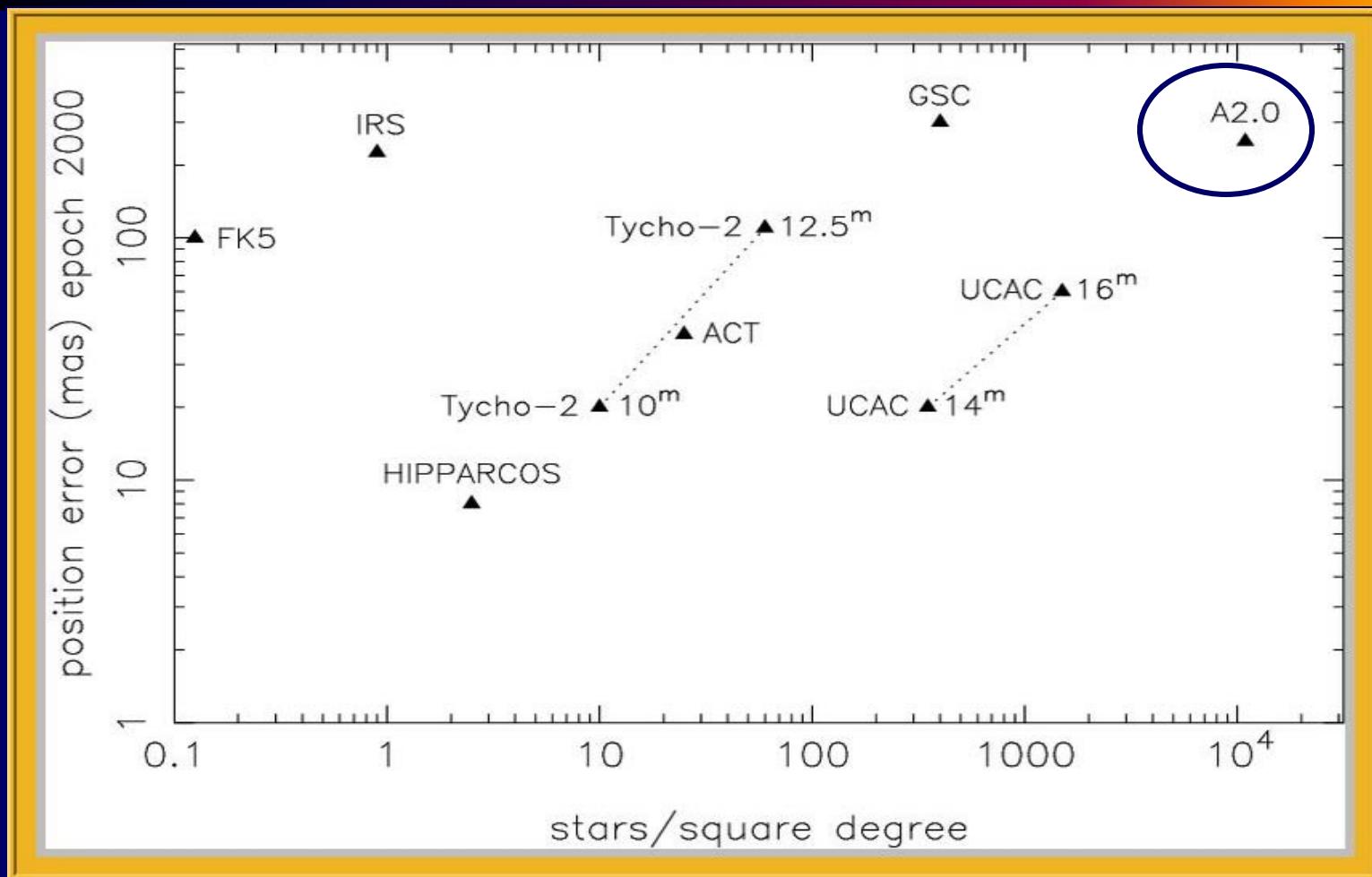
# Major Astrometric Catalogs



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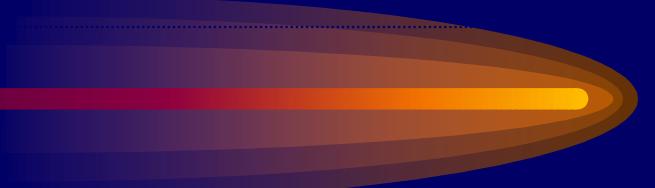
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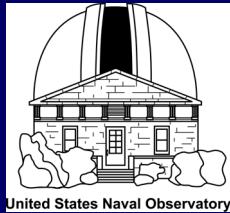
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*USNO A2.0*



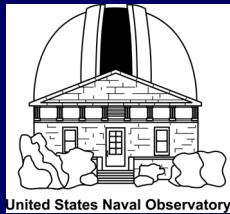
- Number of stars: 526 million
- Mag. range: 10 to 20?
- Accuracies 250 mas?
- Single epoch only, no proper motions
- To be replaced with B series (late 2002)



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# *Catalog Summary*

- Use Hipparcos, if possible
- Tycho-2 next
- UCAC1 can be used in south
- A2 if requiring very faint or very dense stars
- FK5, IRS, ACRS, PMM, ACT, and GSC are not recommended

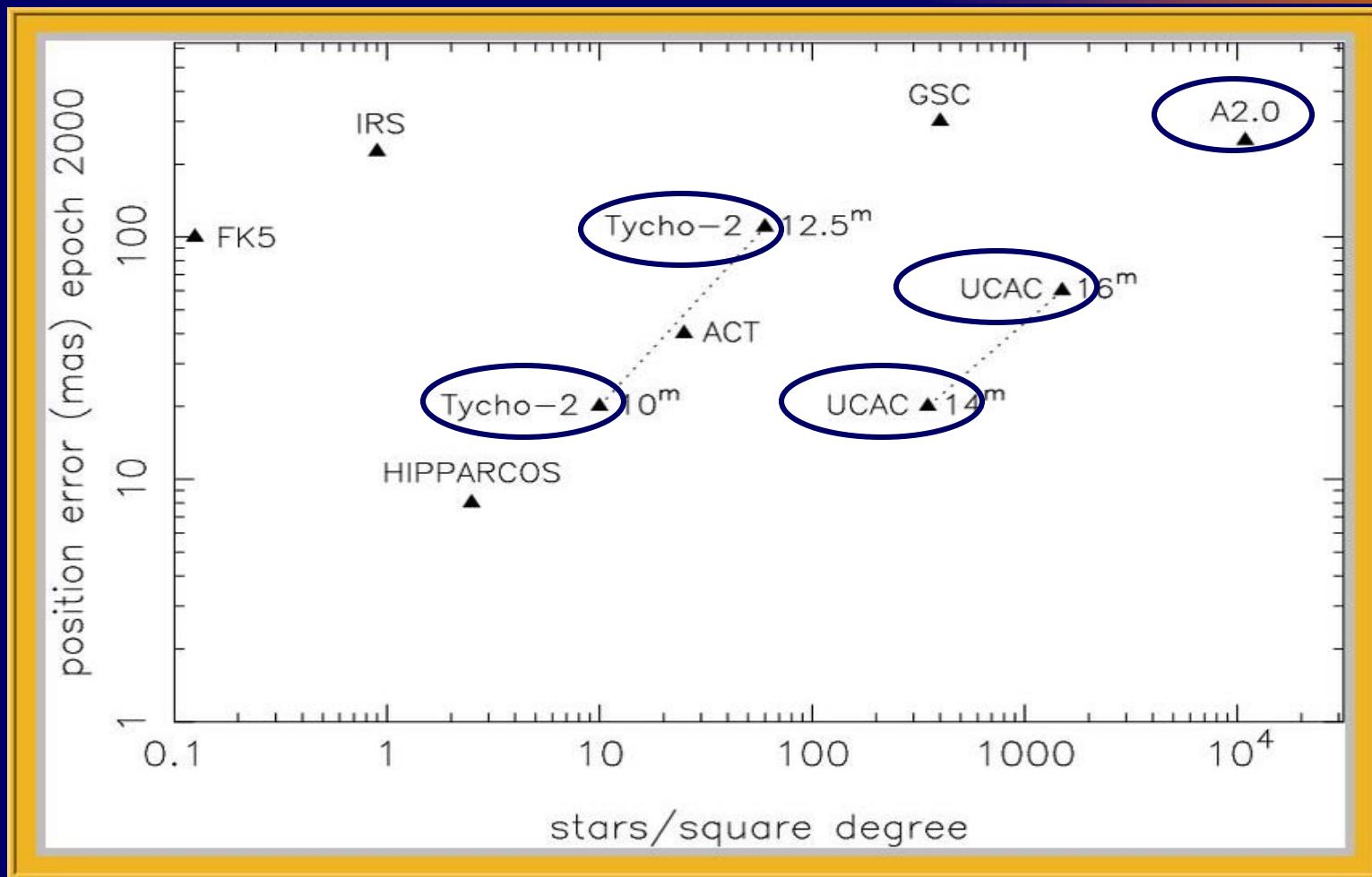


## *Final Thoughts*

- Understand not all catalogs created equal
- Use the best sources of *a priori* data
- If possible, allow for updates

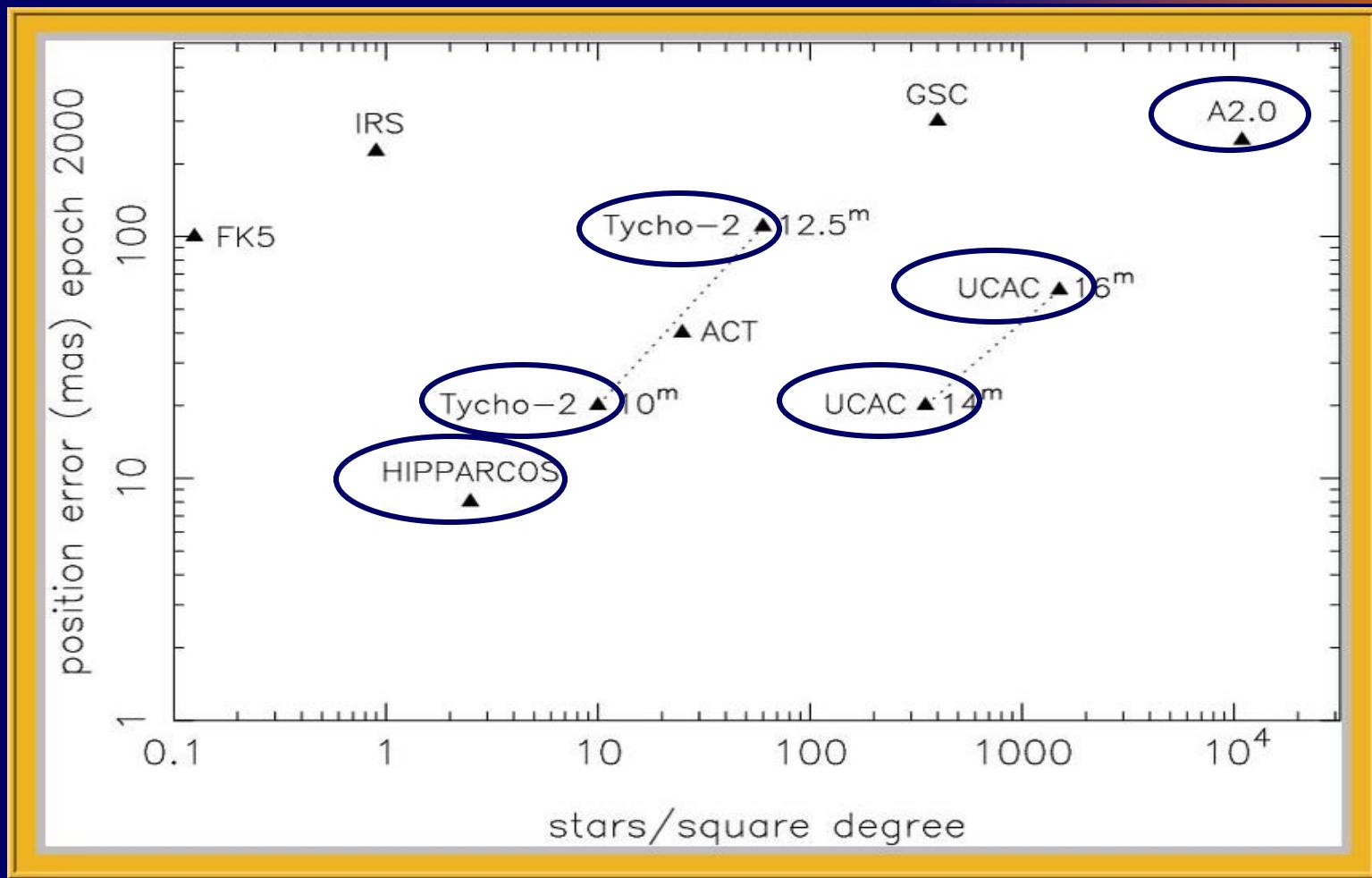


# Recommended Catalogs





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